PROGRESS REPORTS

FROM

EXPERIMENT STATIONS

SEASON 1959-60

KENYA

PUBLISHED BY
THE EMPIRE COTTON GROWING CORPORATION,
12 CHANTREY HOUSE, ECCLESTON STREET,
LONDON, S.W.1.

EDITOR: H. E. KING, O.B.E.

1961

COMMONWEALTH MYCOLOGICAL INSTITUTE
6 MAR 1961

E.C.G.C. STAFF

The Cotton Research Officer, Mr. M. S. Hastie, B.Sc., is a member of the Corporation's staff who works in liaison with the Cotton Research Station, Namulonge, Uganda. By agreement with the Kenya Government, he carries out cotton experiments at the Cotton Lint and Seed Marketing Board experiment station at Kibos (where he is stationed), with sub-stations at Homa Bay and Busia.

KENYA

NYANZA PROVINCE

PROGRESS REPORT FOR THE SEASON 1959-60

BY

M. S. HASTIE

	Cotton	*Food crops*
Sowing	March-September	February-March
Flowering	June-November	
Harvesting	September-March	July

General

Visitors to the Cotton Experiment Station, Kibos, during the season included Mr. B. R. McKenzie, Minister of Agriculture; Mr. A. R. Melville, Chief Research Officer, Department of Agriculture; Mr. A. C. C. Swann and Mr. F. A. Loyd, Provincial Commissioners, Nyanza Province; Mr. T. Hughes Rice, Assistant Director of Agriculture, Nyanza Province; and Mr. J. F. Graham, Senior Entomologist, Scott Agricultural Laboratories, Nairobi. The following members of the Corporation staff at Namulonge also paid visits; Mr. H. L. Manning, Mr. P. H. Le Mare, Mr. C. Logan and Dr. D. M. Robinson.

Mr. M. S. Hastie visited the Coast Province cotton areas, the Galole Irrigation Scheme, and the Corporation's Cotton Research Station at Namulonge, Uganda. He also attended the Coast and Nyanza Provinces Experiments meetings in Nairobi. Mr. A. Davidson visited Namulonge.

Weather

Kibos.—The meteorological readings for the cotton experiment station are summarized in Table 1. The main rains began early this season; 24 inches were recorded for the period from end January to 20th May, but between 21st May and 20th July only 0·41 inches fell (in six showers). Subsequent rainfall was not heavy and there was only one storm of over one inch.

Busia.—Rainfall was well distributed except for a short dry spell in the latter half of May and another in mid July. About half the rain in April fell in storms in excess of one inch.

Homa Bay.—Rainfall during March was considerably higher than usual, but that of April and May was well below expectation. During the period 5th July to 28th August the only effective falls were showers of a quarter of an inch on 30th July and 0·9 inch on 8th August. This prolonged dry spell had serious effects on the April-May planted cotton on the station.

TABLE 1

SUMMARY OF METEOROLOGICAL DATA, COTTON EXPERIMENT STATION, KIBOS, 1959

Month	*Rainfall in.*		*Humidity %*		*Temperature °F*		*Sunshine Campbell-Stokes daily av. hours*	*Wind cup anemometer daily av. m.p.h.*	*Evaporation Piche in.*
	1959	*Average previous 7 years*	*08·00*	*16·00*	*max.*	*min.*			
January	2·16 (5)	2·71 (6)	73·8	58·0	91·0	62·8	8·75	3·25	4·8
February	3·54 (12)	2·92 (6)	75·6	63·1	88·9	62·4	9·14	3·71	4·7
March	10·64 (15)	5·23 (10)	78·4	63·4	86·3	62·4	8·64	3·63	4·0
April	6·51 (15)	8·27 (15)	79·2	77·5	85·2	62·8	8·31	2·59	2·9
May	3·29 (15)	5·74 (16)	83·0	78·1	82·5	62·3	7·50	2·45	2·5
June	0·19 (4)	3·88 (11)	79·4	67·5	84·6	59·0	9·02	2·73	4·1
July	1·05 (8)	2·95 (9)	82·4	69·7	84·2	59·5	7·68	2·93	4·3
August	3·12 (14)	3·37 (12)	83·2	75·0	83·7	59·5	8·01	3·06	3·8
September	3·90 (15)	3·03 (11)	82·9	78·5	83·9	60·5	7·07	3·10	3·6
October	3·51 (15)	2·25 (12)	73·3	55·1	83·4	61·1	7·52	2·86	3·5
November	5·41 (16)	3·22 (12)	75·1	58·1	84·0	61·3	7·28	2·59	3·1
December	2·09 (8)	3·43 (11)	69·5	40·7	87·7	60·1	9·23	3·26	4·1
Totals	45·41 (142)	47·00 (131)							
Means			78·0	65·4	85·5	61·1	8·18	3·01	3·8

Figures in parentheses are the number of days on which rain fell.

Cotton Acreage and Production

Table 2 gives figures for acreage in the various areas and the production in bales (400 lb) of ginned lint together with the percentage of stained cotton (BR).

Table 2

Cotton acreage and production

	1958-59			*1959-60*		
	Acres	*Bales of 400 lb*	*% BR*	*Acres*	*Bales of 400 lb*	*% BR*
South Nyanza	16,000			15,000		
Homa Bay		2,565	11·3		1,536	12·6
Central Nyanza	40,000			38,000		
Kibos		568	26·1		170	30·6
Ndere		1,888	13·1		1,591	9·4
Ukwamba		3,330	6·7		3,663	8·5
Elgon Nyanza	24,224*			25,500**		
Nambare		2,638	6·9		3,466	7·3
Malakisi		1,970	6·7		1,296	14·5
	80,224	12,959	9·9	78,500	11,722	9·8

*Includes 224 acres in North Nyanza.

**Includes 1,500 acres in North Nyanza.

Production in South Nyanza fell by 1,029 bales. Whereas in the previous season there was a concerted drive to get cotton planted at the start of the main rains, this season the growers were allowed to revert to custom and most of the cotton was planted after June. This, together with adverse weather in July and August, reduced the crop considerably. Production in Ukwamba and Nambare showed improvement over 1958-59 but it is thought that a considerable amount of cotton was brought across the border into Kenya because buying posts in the Uganda Eastern Province border area were closed during riots.

Prices paid to growers were 46 cents per lb for A grade (clean) seed cotton and 18 cents per lb for B grade (stained). The prices obtained for lint and seed were better than those of the previous year. Lint prices at auctions of Kenya cotton in Kampala started at shillings 1/90 per lb in October, rose to 2/50 in December, fell to 1/97 in April but recovered at the end of the season's sales to about 2/11 in July. At the seed auctions in Kisumu the average price for AR seed was shillings 405/- and for BR 282/- per ton.

Variety Tests

Variety trials containing the same six strains were planted at four sites in Nyanza. At each the plot size was approximately 47 ft × 12 ft (0·0129 acre), the holes were spaced two feet apart in rows three feet apart on tied ridges and thinned to two plants per hole. There were four replications at Kibos and Homa Bay and six at Kisumu and

Busia. The planting seed was dressed with Perecot 45 at 1:200. Planting was in late April at Kibos and in early May at the other sites. At Kibos, Homa Bay and Kisumu a dust containing 3% gamma BHC and 10% DDT was applied on five occasions at ten-day intervals at a rate of 16 lb per acre. At Busia a spray containing DDT alone was applied four times.

The yields are given in Table 3. Those from Homa Bay were low; the crop was attacked by American bollworm (*Heliothis armigera*) early in the season and the dry period in July and August prevented recovery from the damage. At Kibos and Kisumu notably high yields were obtained.

TABLE 3

COTTON VARIETY TESTS AT FOUR SITES, 1959-60

Yield of seed cotton in lb per acre

Variety	*Site*			
	Kibos	*Homa Bay*	*Busia*	*Kisumu*
Uk51	1769	416	737	1796
Uk55	1795	496	756	1873
Uk58	1776	419	750	1960
S47	1573	322	658	1711
DE715/6M	1598	273	737	2003
NC58	1149	303	710	1808
S.E.	±203·3	±57·9	±33·7	±116·0

Plants of the Uk varieties were larger, more jassid resistant and later maturing than the Uganda varieties S47, DE715/6M and NC58. There was little difference in yield between the three Uk varieties but Uk55 gave the best results at Homa Bay where differences in yield were significant at the 5% level. At this site the Uk varieties in general were clearly superior to the three Uganda types. This superiority did not appear at the other three sites where differences were, in general, small and inconsistent and were not statistically significant.

AGRONOMIC EXPERIMENTS

Spacing Trials

Tests of different spacings of single plants per hole along three foot rows, and of one plant compared with two per hole, were carried out at the four sites used for the variety tests with similar planting dates and the same insecticide treatments. The plot size throughout was 42 ft × 18 ft (0·0173 acre) with four replications at Kibos and Homa Bay, eight at Kisumu and six at Busia. The variety Uk51 was used at Homa Bay and S47 at the other sites, each being the commercial variety of the district in which the test was sited.

The yields from these trials are given in Table 4; at Homa Bay the three foot by two foot spacing with two plants per hole was the

best. This is the standard spacing throughout the province. Holes nine inches apart gave the lowest yield. The results at the other three sites appear to suggest that variation in spacing over the range tested has little effect on yield; the relatively poor yield at one and a half foot spacing at Kibos is out of keeping and must be regarded as a chance effect.

TABLE 4

SPACING TRIALS AT FOUR SITES, 1959-60

Yield of seed cotton in lb per acre

Treatment		*Site*			
Spacing inches (1)	*Plants per hole*	*Kibos*	*Homa Bay*	*Busia*	*Kisumu*
24	2	1627	880	864	1462
18	2	1354	588	879	1411
12	2	1675	654	850	1426
12	1	1638	—(2)	831	1454
9	1	1657	520	831	1439
	S.E.	±111·3	±44·4	±80·6	±52·9

(1) This is spacing along rows 36 in. apart on tied bench ridges throughout.
(2) This treatment was not included at Homa Bay.

Cultivation and Manurial Trials

Replicated trials of flat cultivation in comparison with tied bench ridges, both with and without a dressing of five tons of farmyard manure, were planted at Homa Bay with variety Uk51 and at Busia with S47. The spacing, seed treatment, planting dates and insecticide applications were as those of the variety tests at the same sites (already described).

The plots with tied bench ridges showed better vegetative growth and appeared to produce more bolls than the plots on the flat but the yields, given in Table 5, do not reflect this. The farmyard manure improved the growth but again there was no very definite indication of higher yields resulting.

TABLE 5

FLAT CULTIVATION AND RIDGING WITH AND WITHOUT FYM

Yield of seed cotton lb per acre

	Homa Bay		*Busia*		*Combined results*		
	Flat	*Ridged*	*Flat*	*Ridged*	*Flat*	*Ridged*	*Mean*
	S.E. ± 28·7		S.E. ± 35·4				
No FYM	552	480	608	525	580	503	541
Five tons FYM	527	560	634	541	581	551	566
Mean	540	520	621	533	581	527	
	±20·3		±25·0				

There were 4 replications at Homa Bay giving only 9 degrees of freedom for error. Plot size was 38 ft × 30 ft (0·0261 acre).

At Busia there were 6 replications with plots of 36 ft × 20 ft (0·0165 acre).

Drainage and Gypsum Treatment of Semi-waterlogged Land

A small field of three acres was bench ridged and tied, and planted to cotton in the 1957-58 season. When the crop was nearing maturity a map was made of the field showing areas of no growth, poor to medium growth and good growth. This season the same field was divided up into small plots with furrows at 24 feet, 12 feet and 6 feet apart and given dressings of gypsum at three levels: nil, two tons per acre, and four tons per acre. Cotton was planted on 27th April. At the end of the season a further map was made of the field and plot yields taken.

The map made in 1958 showed that almost 30% of the area produced no growth, about 50% was poor to medium and 20% good growth. In contrast, the 1959 map showed a few small isolated areas of no growth, about 40% poor to medium, and the remainder good growth. The average yield for the field was 835 lb of seed cotton per acre. The addition of gypsum improved yields by about 80 lb per acre although there was little difference in yield between the two and four tons per acre. The plots with furrows at 12 feet apart gave the highest yields and those at 6 feet apart the lowest, the difference between the two averages being 112 lb of seed cotton per acre.

Rainfall subsequent to planting, which was intentionally late, was low and it would appear that the best drained plots suffered from lack of moisture while the plots with drains 24 feet apart were large enough to hold moisture in the hollows, causing poor stands and waterlogging. It seems that drains 24 feet apart, although an improvement on flat cultivation under these conditions, do not provide adequate drainage, while spacing the drains six feet apart may require to be accompanied by planting at the start of the main rains to avoid shortage of moisture.

Insect Control in Variety Tests and Agronomic Experiments

As recorded in earlier sections of this report both the variety tests and the agronomic trials were this season given some protection against insect pest attack. The insecticides used and the method and timing of the applications were those recommended to the growers.

It is by no means certain, however, that the results have been altogether satisfactory; the pests were not eliminated and there may well have been some migration from poor to good growth interfering with, and perhaps reducing or even reversing, the effects of other treatments. There is a suggestion of this in the results of the comparison of flat cultivation with ridging and in the lack of response to farmyard manure. This could also, perhaps, be the explanation of the difference in yield between the Tanganyika Uk varieties and the Uganda types at Homa Bay.

Entomology

by

A. Davidson

(This report is included by courtesy of the Director of Agriculture, Kenya)

Introduction

A period of drought from late May to mid August, varying in severity throughout the province but worst in the Lake Shore areas, retarded cotton growth and delayed the onset of insect attack. Experimental results should therefore be interpreted with some caution; confirmation will be sought in more normal years before advice on practical applications is offered.

Work on Experimental Stations

Kibos

Attempts were made to devise or improve techniques for studying the basic biology of cotton pests, especially stainers (*Dysdercus* spp.). Insectary breeding of stainers by Geering's (1956) technique was employed to provide material of uniform age and environment for marking and release in population and longevity studies, but considerable difficulties were encountered with high mortality in the younger instars (perhaps due to lower air humidities than at Namulonge, where the technique was evolved).

An experiment to study stainer populations in the small-plot conditions of African cultivation was carried out on a checkerboard layout of alternate 1/5 acre plots of cotton and another crop (sorghum followed by beans). Populations of *D. nigrofasciatus* were estimated by three methods, the results of which are shown in Figure 1.

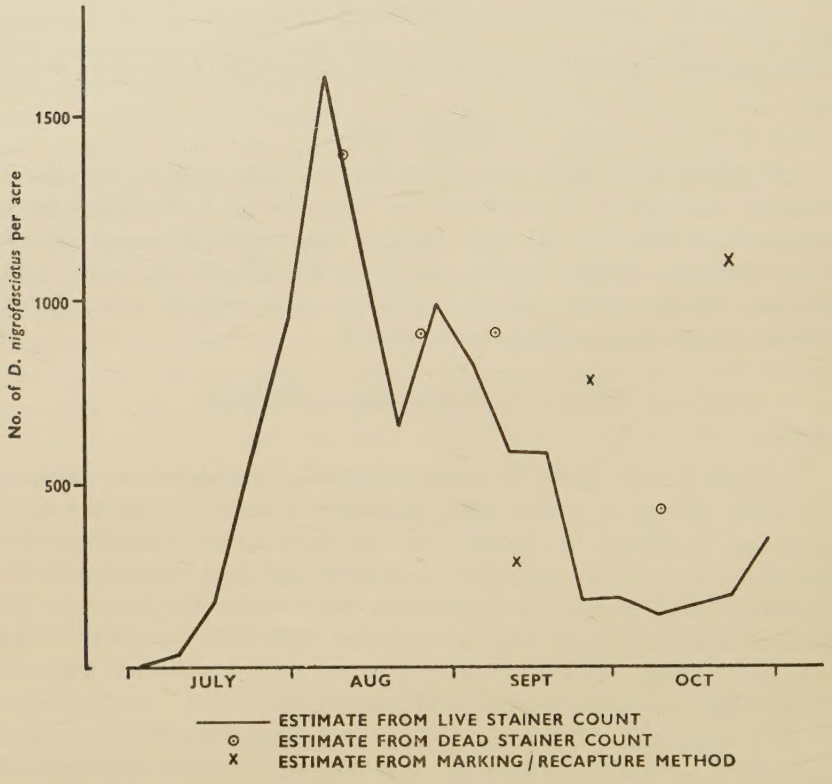
(1) By direct counting on randomly selected rows in each plot. This method is likely to give an underestimate, varying with the population density and with the thickness of the cotton and weed growth.

(2) By spraying with 0·1% pyrethrins in the evening and counting dead stainers in sample quadrats the following morning. This was expected to give higher estimates than the first method but in early trials did not do so, because chickens from neighbouring African holdings ate the dead stainers before they could be counted. A chicken-proof fence was erected, and subsequent estimates were higher than those obtained by the first method.

(3) By release and recapture of marked specimens according to the method of Bailey (MacLeod, 1958). Results obtained were rather

FIGURE 1

POPULATION OF STAINERS AT KIBOS ESTIMATED BY THREE METHODS



erratic, possibly owing to rubbing-off of the cellulose paint marks before drying, and to deaths from injuries received in handling.

In the marking experiments the stainers showed little tendency to move between adjacent plots when the population was stable; marked insects were usually recaptured on the plots on which they were released. After pyrethrum spraying there was some movement into the sprayed plots, but these never regained the population level of the rest of the field. The observations were made in the period of general population decline, however.

Various trapping methods for recording cotton insects were tested. A Robinson pattern U.V. light trap was constructed and operated regularly, but very few bollworm adults (*Heliothis armigera* and *Earias* spp.) were taken—bollworm populations were low throughout the season. A small battery-operated white light trap was constructed (modified from Weber, 1956), but again the scarcity of bollworms did not permit full assessment of its usefulness. Two window traps were

erected in connection with the stainer population experiment to assess diurnal flight activity. Few stainers were caught, however, probably because the traps were set too high. Preliminary tests of sticky traps for small insects were made with ladder-like series of adhesive-coated glass plates. Jassids, mirids and aphids were caught at all heights from six inches to five feet, at all stages of plant growth from June to November, although slightly greater numbers were caught at zero to two feet.

A trial to compare dust formulations of malathion and endrin with DDT and BHC showed clear differences in their effects on insect populations during the dusting period and on the earlier pickings, but later pickings in the rather extended harvest (due to the May-July drought) tended to reduce the differences in the final yield. From the results shown in Table 6 it is seen that BHC gives the best control of

TABLE 6

LIVE AND DEAD STAINERS PER ACRE, DUSTING TRIAL, KIBOS

Variety—S47. Planting date—9th April. Layout—randomized blocks separated by undusted strips. Replications—4. Plot size—96 ft. × 66 ft. Dusting dates—July 23, August 4, 12, 23, September 9

Treatment	*Dead stainers 24 hours after dusting*	*Live stainers at weekly counts during dusting period*
3% gamma BHC 10% DDT	6111	761
3% malathion 10% DDT	1674	1015
1% endrin 10% DDT	948	1722
1% endrin 3% malathion	1311	1274
Control	20	2467
S.E.	±117	±45

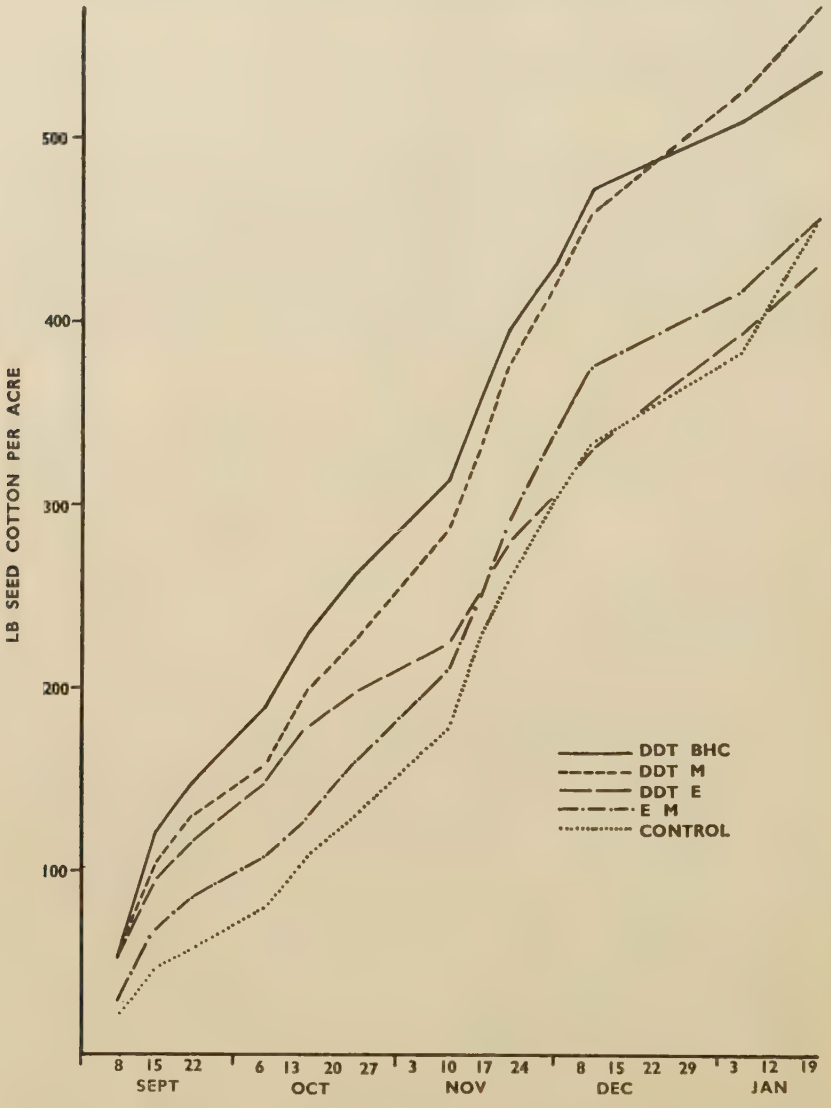
stainers, with malathion second, DDT and endrin having little or no effect. The apparent discrepancy between the number of dead stainers found and the number of live stainers estimated may be due partly to the inefficiency of the counting method for live stainers, mentioned above, and partly to the fact that the dead stainer counts comprised part of the cumulative kill of several days, although only stainers which appeared to be freshly dead were counted. The superior yields of plots treated with the three dusts containing DDT in the early pickings, shown in Figure 2, may be due to control of bollworms, but records of bollworm incidence were not kept.

As it seems unlikely that either malathion or endrin will replace DDT-BHC in Nyanza further work on those insecticides is not justified at present. The results of this experiment will be published more fully elsewhere.

On harvesting this experiment an outer discard of six feet and an inner discard of a further twelve feet were harvested separately from the central portion of each plot, giving areas of approximately one

FIGURE 2

CUMULATIVE YIELDS OF COTTON IN A TRIAL OF FOUR FORMULATIONS OF INSECTICIDE AT KIBOS



seventh, one tenth and one twenty-fifth of an acre respectively. Discarding usually increased the error variance; any removal of marginal effects was more than compensated by the effect of the heterogeneity of Kibos soil and drainage on the smaller areas. It seems that the minimum plot size for satisfactory yield results in insecticide experiments at Kibos is one tenth of an acre.

Busia.

Following work in Uganda (Coaker, 1960) a trial was laid down to compare 4 lb DDT per acre in four doses at ten-day intervals with 3 lb in six doses at six-day intervals, with early and late spraying periods (delayed owing to the drought). Yield results, summarised in Table 7, show that the latter rate gave slightly, but not significantly, greater yields than the former. The later spray period gave significantly ($P<5\%$) better yields than the earlier; the numbers of bollworms (flared square counts) and mirids (leaf grade) both increased on unprotected plots during the later spray period.

This experiment was harvested with a single wide discard on each plot, reducing the plot size from one twentieth to one fortieth of an acre. Although the soil at Busia is much more uniform than that at Kibos, the reduced plots again gave a higher coefficient of variation for yield (29·34%) than the whole plots (25·58%).

TABLE 7

YIELDS OF DDT TIME AND RATE TRIAL, BUSIA

Variety—S47. Planting date—April 15. Layout—randomized blocks separated by unsprayed strips. Replications—6. Plot size—69 ft × 31 ft.

Rate of DDT lb per acre per application	*Spray dates*	*Yield of seed cotton lb per acre*
1	July 15, 25 August 4, 14	412
1	August 4, 14, 24 September 3	464
½	July 15, 21, 27 August 1, 8, 14	438
½	August 4, 10, 17, 22, 28 September 3	477
Control	—	365
	S.E.	±18·44

DISTRICT PLOTS AND NEW AREAS

District plots on holdings worked by their peasant owners were found to give reasonable uniformity of cultivation standards only where the group of plots in an area was under the constant supervision of a recorder trained for the purpose and working on them exclusively. Scattered plots in Central Nyanza under the supervision of Divisional and Locational staff were badly neglected by their owners and had to be abandoned.

South Nyanza.—Thirteen blocks, each of 1 acre, were divided into three plots for two dusting rates and control. Yields are shown in Table 8.

In each of the dusting treatments, nine of the thirteen plots gave economic increases over their corresponding controls. The heavier dusting rate gave higher yields, but the cash return from each of the two rates was double the cost of insecticide.

Elgon Nyanza, Teso.—Eleven blocks were each divided into two

plots, the standard 4 × 1 lb DDT treatment versus a control. Seven sprayed plots gave economic increases over their controls; the average cash return was 63% greater than the cost of insecticide.

Elgon Nyanza, Luakhakha.—Twenty blocks were used, again with the standard treatment versus control. Thirteen sprayed plots gave economic increases over their controls; the average cash return was 78% greater than the cost of insecticide. Yields are shown in Table 9.

TABLE 8

YIELDS OF DISTRICT PLOTS, SOUTH NYANZA

Variety—Uk51. Planting dates—March 28 to April 23. Layout—randomised blocks on peasant farms. Replications—13. Plot size—¼ acre. Dusting period—mid July to early September.

Rate of dust (3% gamma BHC, 10% DDT) lb per acre	*No. of applications*	*Yield of seed cotton lb per acre*	*% AR*
16	5	1276	78·2
12	5	1189	79·1
Control	—	983	66·5
	S.E.	±59·7	±0·83

TABLE 9

YIELDS OF DISTRICT PLOTS, ELGON NYANZA

Variety—S47. Planting dates—April 19 to May 20. Layout—randomised blocks on peasant farms. Replications—Teso 11, Luakhakha 20. Spray period—late July to early September.

Treatment	*Yield of seed cotton lb per acre*	*% AR*
Teso		
4 × 1 lb DDT per acre	572	81·1
Control	352	73·8
S.E.	±51·42	±1·22
Luakhakha		
4 × 1 lb DDT per acre	470	70·5
Control	232	47·5
S.E.	±29·69	±1·64

Records of insect populations and damage on the district plots before and after insecticide treatments are shown in Table 10.

The higher incidence of stainers on treated plots, after dusting and spraying had finished, is probably associated with the larger numbers of bolls retained and better vegetative cover resulting from the use of insecticides.

The differences between the Teso and Luakhakha trials, and other factors such as high incidence of *Helopeltis* and lower incidence of aphids in Luakhakha, may justify the separation of these areas into distinct zones if similar results are obtained in more normal years.

New areas.—Attempts were made by Agricultural Officers to introduce cotton to new areas in the Province, resulting in several requests for entomological assistance.

Table 10
Pest incidence on district plots

Site	Date	Treatment	*D. nigro-fasciatus* No. per acre	*D. super-stitiosus* No. per acre	Mean mirid leaf grade	Flared squares per acre
S. Nyanza	July 7-10	Before dusting	1746	454	0·453	421
,,	Sept. 3-6	5×16 lb dust	659	167	0·625	56
,,	,,	5×12 lb dust	614	223	0·632	89
,,	,,	Control	212	0	0·694	67
Teso	July 21-22	Before spraying	12	0	1·478	165
,,	Sept. 9	4×1 lb DDT spray	290	211	0·995	1096
,,	,,	Control	118	13	2·087	2930
Luakhakha	July 23-24	Before spraying	0	0	0·718	44
,,	Sept. 17	4×1 lb DDT spray	116	385	0·947	7
,,	,,	Control	29	131	2·299	0

At Muhoroni, cotton was tried under European farming conditions on black cotton soil and large healthy plants were obtained. Pest control by the standard dusting regime was successful, but the pests increased when dusting was discontinued, and a severe late-season attack of stainers, pink bollworm and false codling moth completely destroyed the crop.

An attempt was made to introduce cotton to Kipsigis farmers in Belgut, on the south-east of the Kano Plain. Dusting was done rather late but was reported to have given satisfactory control of stainers, and yields of about 800 lb per acre were obtained.

At Kabosson, in S.E. Kericho near the Masai border, some trials were dusted, again rather late, so that adequate stainer control was not achieved.

Future trials in new areas should receive "blanket" insecticide treatments, to determine the optimum potential yield under conditions as nearly insect-free as possible. Economic insecticide regimes can be investigated subsequently.

Survey of alternate hosts

A survey was made of all wild Malvaceae and other possible hosts of stainers. Specimens were collected for identification and for planting at Kibos. Seven species of *Hibiscus,* three of *Abutilon* and other Malvaceae have been recorded as hosts of stainers in the province.

In June, adults and nymphs of both *D. nigrofasciatus* and *D. superstitiosus* were found feeding on a red sorghum in the Kibos variety collection. A survey of all the varieties in the collection showed that 25% of the red varieties and 15% of the white or brown varieties were attacked by adult stainers, but only the first-discovered red variety was attacked by nymphs. Enquiries led to a few reports of stainers feeding and breeding on sorghum (usually red) in the Lake Shore areas. As the June-July influx of stainers into cotton corresponds with the sorghum harvest, the relationship requires further investigation.

References.

Coaker, T. H. (1960). *Prog. Rep. Exp. Stas. Emp. Cott. Gr. Corp. Uganda,* 1958-59, 32-37.

Geering, Q. A. (1956). A method for controlled breeding of cotton stainers, *Dysdercus* spp. (Pyrrhocoridae). *Bull. ent. Res., 46,* 743-746.

MacLeod, J. (1958). The estimation of numbers of mobile insects from low-incidence recapture data. *Trans. R. ent. Soc. Lond., 110,* 363-392.

Weber, G. (1956). Insektenfanglampen für den Warndienst. *Z. Pflkrankh., 63,* 545-550.

Received September 1960.

PROGRESS REPORTS FROM EXPERIMENT STATIONS

The reports for the seasons up to and including 1950-51 were published in seasonal volumes; the following are still in print and available at 3/- per volume post free.

1923-25 (one volume), 1926-27, 1931-32, 1934-35,
1935-36, 1942-43 and 1945-46 to 1950-51.

From 1951-52 the reports from each territory were published individually each season. A few of the 1951-52 reports are out of print, but all others are available post free at 2/6 per report or £1 for the seasonal set.

T. BUNCLE AND CO. LTD., ARBROATH